UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/041,678	01/07/2002	Gilbert Wolrich	10559-610001 / P12849	2963

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EXAMINER
CHACE, CHRISTIAN

ART UNIT	PAPER NUMBER
2187	

DATE MAILED: 01/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>03 November 2003</u>.

2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-23</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-23</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>07 January 2002</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application)
since a specific reference was included in the first sentence of the specification or in an Application Data Sheet.
37 CFR 1.78.

    a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific
reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.

4)☐ Interview Summary (PTO-413) Paper No(s). _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: .

DETAILED ACTION

Response to Amendment

This Office action has been issued in response to Amendment filed 3 November

2003.Claims 1-23 are pending. Applicants' arguments have been carefully and

respectfully considered in light of the instant amendment, but they are not persuasive.

Accordingly, this action has been made FINAL.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Chang

et al (US Patent # 5,634,015).

With respect to independent claims 1 and 16, storing a subset of queue

descriptors on a cache in a processor's memory controller logic is disclosed in column

12, lines 29 and 30, which discuss the GAM local memory (cache) accessed by the

processor P14.

Receiving a request to perform an enqueue or a dequeue operation with respect

to a particular queue is disclosed in column 17, line 7 as an enqueue operation. A

dequeue operation is disclosed in column 11, lines 40-43, which discloses releasing a

packet to a free list of buffer space. This release inherently requires dequeueing, as

there cannot be a queue for a buffer that does not exist any longer.

A queue descriptor (buffer pointer) is disclosed in column 17, lines 45-47. A cache is disclosed in figure 1 as local memory #30. Referencing a corresponding queue descriptor stored in the cache (in a processor's memory controller logic) to execute the operations, the queue descriptor specifying a structure of the particular queue is disclosed in column 17, lines 20-51 as the BTE, which is stored in the local memory and references corresponding descriptors.

With respect to claims 2, 10, and 17, maintaining a list of addresses associated with the subset of queue descriptors stored in the cache is disclosed, again, as the BTE stored in GAM local memory #30 in column 17, lines 20-51. The list being stored in a content addressable memory, or CAM, is disclosed in column 11, line 17, which discloses that the GAM local memory #30 is indeed a CAM. Also, column 48, lines 57-59 reinforce the desirability of an associative memory, which is what a CAM is.

With respect to claims 3 and 18, storing in the cache a queue descriptor corresponding to each address in the list I disclosed in column 17, line 25.

With respect to claims 4, 11, and 19, "tracking" an address stored in the local memory is disclosed in column 18, lines 5-12, the address corresponding to a queue descriptor that was least recently used for an enqueue or dequeue operation, as discussed supra with respect to claims 1 and 16.

With respect to claims 5, 12, and 20, removing the LRU address from the list if the list lacks an entry corresponding to the queue specified by the request and replacing the removed address with an address corresponding to the specified queue is disclosed in column 2, lines 22-28.

With respect to claims 6, 13, and 21, issuing commands to the memory controller logic to return and fetch queue descriptors to and from the memory is disclosed in column 17, lines 35-45. Maintaining coherence between the queue descriptors in the cache and the list of addresses in the local memory (CAM) is performed through the 1:1 ratio of descriptors each having their own address, as disclosed in the cited passage.

With respect to claims 7 and 14, modifying the queue descriptor referenced by the enqueue or dequeue operation and returning the modified queue descriptors to memory from the cache is disclosed in column 17, lines 45-51. When a buffer goes from free buffer to allocated, the BTE information is "modified," or changed.

With respect to claims 8 and 23, executing an enqueue operation without waiting for completion of a previous operation is discussed in column 5, lines 26-29. Also, column 16, line 38 discloses "multicast," which being multiple operations being performed at one time, reads on the instant claim as well. The passage recites, "Without waiting for sources" of new allocation, a new allocation being an enqueue operation.

With respect to independent claim 9, a memory to store queue descriptors is disclosed as PM #16 in figure 1, to which the BTE references queues. The BTE specifies the structure of the respective queues stored in PM #16 as they are allocated from the free buffer pool. A network processor is disclosed coupled to the memory as #22 in figure 1. A memory controller logic that includes a cache (#30) to store a subset of the queue descriptors (BTE) in the memory is disclosed as GAM #18 in figure 1 as well. A programming engine that accesses a list of addresses in the memory

corresponding to the queue descriptors stored in the cache is disclosed as BTE, as discussed supra with respect to claims 1 and 16. The processor being configured to reference a corresponding queue descriptor in the cache in response to a request to perform an enqueue or dequeue operation with respect to a particular queue, also discussed with respect to claims 1 and 16, is disclosed in column 17, lines 45-47.

With respect to claim 15, the processor being configured to execute an enqueue operation without waiting for completion of a previous operation is disclosed supra with respect to claim 8. Doing so if the queue would otherwise be "unempty" upon completion of the dequeue operation is disclosed in column 20, lines 23-27.

Response to Arguments

With respect to applicants' argument that Chang neither describes nor suggests, "storing a subset of queue descriptors in a cache," examiner respectfully disagrees. GAM local memory #30 in figure 1 is the cache, as explained supra with respect to claims 1 and 16. As discussed in column 12, lines 25-27, those data structures used by the GAM to organize buffers into packets into queues are stored in local memory #30. From the discussion supra with respect to BTE's in claims 1 and 16, we know that BTE's are the queue descriptors, which describe the data structures used by GAM, making them a subset of all the data structures (which each have queue descriptors) in the system.

With respect to applicants' argument that Chang does not disclose or suggest using the QCB to modify the queue descriptors, examiner respectfully notes that this is not in the claim language as is, therefore, not applicable to the instant claims.

With respect to applicants' argument that the features of returning to memory from the cache portions of the queue descriptor modified be the operation further distinguish claim 7 over Chang, examiner is unsure what applicants are arguing. There appears to be a typographical error in the relevant sentence in applicants' remarks – on the last page, end of the first paragraph. In the interest of compact prosecution, however, examiner will try to further explain his position with respect to claim 7. Modifying a queue descriptor referenced by the enqueue or dequeue operation is inherent – when a buffer is dequeued, we know from column 11, lines 40-43, that the buffers are put back into a free buffer pool. When that is completed, the buffer pointers must, inherently, be altered, or they would continue to point to the same thing, and the system would be rendered useless once all of the space was full. We know also that the pointers are stored in the BTE in the local memory #30. Therefore, when the subset of queue descriptors, meaning the set in use instantly, is put back in the free buffer pool, the modified descriptors are also released from the cache to the memory, by the definition of the subset in Chang being the active set.

Applicants appear to begin to argue a limitation in claim 9, but then cite claim 17, and do not present an argument with respect to either. Examiner assumes this is a typographical error.

Claim 16 is cited, but no argument is presented. For Chang's applicability to the instant claim language, please refer to the discussion of same supra.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).
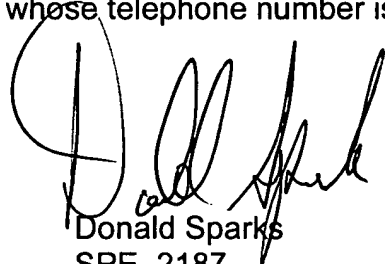
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christian P. Chace whose telephone number is 703.306.5903. The examiner can normally be reached on 9-4-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Donald Sparks can be reached on 703.308.1756. The fax phone number for the organization where this application or proceeding is assigned is 703.305.3719.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703.305.3900.

Christian P. Chace
DS/cpc

Donald Sparks
SPE, 2187